

WHAT IS CLAIMED IS:

## 1. A parking assist apparatus comprising:

a display device that displays an actual image of surroundings of a vehicle and a target parking frame indicating a target parking position where the vehicle is to be parked;

an initial display control device that initially displays the target parking frame on the display device by using a past setting of the target parking position performed by a user; and

a guide device that automatically guides the vehicle to the target parking position set by the user moving the target parking frame initially displayed.

## 2. The parking assist apparatus according to claim 1, further comprising:

a control parameter computing device that computes an amount of movement of the vehicle and an amount of change in orientation of the vehicle that are needed in order to guide the vehicle from a parking start position to the set target parking position, as control parameters;

a storage device that stores the computed control parameters in association with the computed amount of movement and the computed amount of change; and

an estimation device that estimates the target parking position based on a driving state of the vehicle up to the parking start position, and that estimates the amount of movement and the amount of change that are needed in order to guide the vehicle from the parking start position to the estimated target parking position, wherein the initial display control device retrieves the control parameters corresponding to the estimated amount of movement and the estimated amount of change from the storage device, and initially displays the target parking frame on the display device based on the retrieved control parameters.

3. The parking assist apparatus according to claim 2, wherein the estimation device constantly computes and stores the change in orientation of the vehicle for every predetermined travel distance during driving the vehicle, and estimates the amount of change based on the stored change in orientation of the vehicle.

## 4. A parking assist apparatus comprising:

an estimation device that estimates an amount of movement of a vehicle and an

amount of change in orientation of the vehicle that are needed for guiding the vehicle from a parking start position to a target parking position, as control parameters, based on a driving state of the vehicle up to the parking start position, in order for a user to set the target parking position by moving a target parking frame displayed together with an actual image of surroundings of the vehicle in an garage parking assist operation; and

an initial position determination device that determines an initial display position of the target parking frame based on the estimated control parameters, wherein the estimation device constantly computes and stores the change in orientation of the vehicle for every predetermined travel distance during driving the vehicle, and estimates the control parameters based on the stored change in orientation of the vehicle.

5. A parking assist method comprising:

a first step of initially displaying a target parking frame in a screen of a display device displaying an actual image of surroundings of a vehicle by using a past setting of a target parking position performed by a user; and

a second step of automatically guiding the vehicle to the target parking position set by the user moving the target parking frame displayed together with the actual image of surroundings of the vehicle.

6. A parking assist method comprising:

a first step of constantly computing and storing the change in orientation of the vehicle for every predetermined travel distance during driving a vehicle;

a second step of estimating an amount of movement of the vehicle and an amount of change in orientation of the vehicle that are needed for guiding the vehicle from a parking start position to a target parking position, as control parameters, based on a driving state of the vehicle obtained before the vehicle reaches the parking start position, which includes the stored change in orientation of the vehicle;

a third step of determining an initial display position of the target parking frame based on the estimated control parameters;

a fourth step of displaying a target parking frame to the determined initial display position together with an actual image of surroundings of the vehicle;

a fifth step of setting a position of the target parking frame which is moved by the user, as the target parking position; and

a sixth step of guiding the vehicle to the target parking position in the garage

parking operation.

7. A parking assist apparatus comprising:

a detection device that detects a stopped state of a vehicle; and

a recognition device that, if the stopped state of the vehicle is detected by the detection device, recognizes a position having a predetermined relationship with a first stopped position of the vehicle occurring when the stopped state is detected, as a target parking position.

8. The parking assist apparatus according to claim 7, further comprising a display device that displays the recognized target parking position together with an actual image of surroundings of the vehicle.

9. The parking assist apparatus according to claim 8, further comprising a manual operation device that moves and adjusts a display position of the target parking position in accordance with a switch operation.

10. The parking assist apparatus according to claim 7, wherein if a steering angle being substantially at a neutral position is detected in addition to the stopped state of the vehicle, the recognition device recognizes, as the target parking position, the position having the predetermined relationship with the first stopped position of the vehicle.

11. The parking assist apparatus according to claim 7, wherein the recognition device recognizes the position having the predetermined relationship with the first stopped position as at least one candidate for the target parking position, and recognizes a candidate among the at least one candidate which is recognized with reference to a second stopped position having a predetermined relationship with a present vehicle position that is apart from the first stopped position, as the target parking position.

12. The parking assist apparatus according to claim 11, wherein if a plurality of candidates exist, the recognition device recognizes, among the plurality of candidates, a candidate recognized with reference to the second stopped position that is nearest to the present vehicle position that is apart from the first stopped position, as the target parking position.

13. The parking assist apparatus according to claim 11, wherein if the candidate does not exist, the recognition device recognizes a preset position to which the vehicle is guidable with reference to the present vehicle position that is apart from the first stopped position, as the target parking position.

14. A parking assist method comprising:

a first step of detecting a stopped state of a vehicle; and

a second step of recognizing, as a target parking position, a position having a predetermined relationship with a stopped position of the vehicle occurring when the stopped state of the vehicle is detected in the first step.